

# Homework 2

Christophe Hunt

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### 1 Page 69: problem 12

From this vague scenario, identify a problem you would like to study. Which variables affect the behavior you have identified in the problem identification? Which variables are the most important?

A company with a fleet of trucks faces increasing maintenance costs as the age and mileage of the trucks increase

### 2 Page 79: problem 11

Determine whether the data set supports the stated proportionality model

$$y \propto x^3$$

Table 1:

y	4	11	22	35	56	80	107	140	175	215
x	1	2	3	4	5	6	7	8	9	10

### 3 Page 94: problem 4

Lumber Cutters - Lumber cutters wish to use readily available measurements to estimate the number of board feet for lumber in a tree. Assume they measure the diameter of the tree in inches at waist height. Develop a model that predicts board feet as a function of diameter in inches.

Use the following data for your test.

The variable  $x$  is the diameter of a ponderous pine in inches, and  $y$  is the number of board feet divided by 10.

- Consider two separate assumptions, allowing each to lead to a model. Completely analyze each model.

Table 2:										
x	17	19	20	23	25	28	32	38	39	41
y	19	25	32	57	71	113	123	252	259	294

- b. Assume that all trees are right-circular cylinders and are approximately the same height.
- ii. Assume that all trees are right-circular cylinders and that the height of the tree is proportional to the diameter.
- b. Which model appears to be better? Why? Justify your conclusions.

## 4 Page 99: problem 3

Discuss several factors that were completely ignored in our analysis of the gasoline mileage problem.

## 5 Page 104: problem 2

Tests exist to measure the percentage of body fat. Assume that such tests are accurate and that a great many carefully collected data are available. You may specify any other statistic, such as waist size and height, that you would like collected. Explain how the data could be arranged to check the assumptions underlying the sub models in this section. For example, suppose the data for males between ages 17 and 21 with constant body fat and height are examined. Explain how the assumption of constant density of the inner core could be checked.